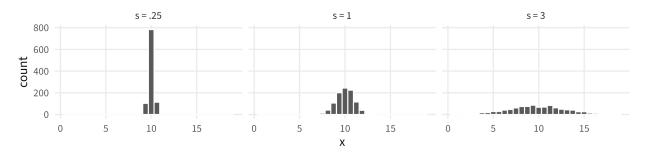
# **NOTES 05: QUANTITATIVE VARIABLES**

Stat 120 | Fall 2025 Prof Amanda Luby

Quantitative variables are	e best visualized with a <b>histogram</b>	or <b>dotplot</b> (depending on sample size)
		most about the <b>shape</b> and <b>center</b> . When w mber, we often choose the <b>mean</b> , <b>median</b> , c
Skewed Right	Symmetric	Skewed Left
There are various ways to	describe the center of the distribu	ution. The three most common are:
i Note		
Mean		
i Note		
Median		



### 1 Standard Deviation





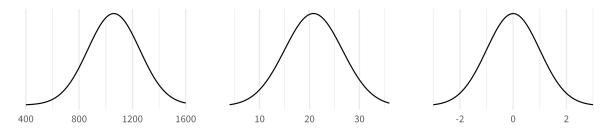
The **68**, **95**, **99** rule says that:

**Example:** Standardized test scores are often designed to have bell-curved distributions. The mean reported ACT score at Carleton is 33 with a standard deviation of 1.493. If we assume that Carleton's distribution is also symmetric and approximately bell-shaped, what interval gives the ACT score range of 95% of students?

#### 2 Z-Scores



**Example:** The nationwide average ACT score is 20.8 with a standard deviation of 5.8. The nationwide average SAT score is 1060 with a standard deviation of 195. A college admissions officer wants to determine which of two applicants scored better on their standardized test with respect to the other test-takers: Jordan, who earned an 1310 on their SAT, or Jim, who scored a 31 on his ACT?



## 3 Boxplots

A boxplot is a visualization of the **five number summary**, plus outliers.

i Note
Outlier

Boxplots are especially useful for comparing *quantitative variables* across different levels of a *categorical variable*.

## 4 Outliers and Skewed Data

Outliers can be annoying. We have three options for dealing with them:

- 1. Ignore them, and note that results may be impacted
- 2. Remove them, and note that results may be impacted (preferably include results from (1))
- 3. Transform the variable so they "matter" less

